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SOLAR/2016-79/05

Monthly Performance Report

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LOUDOUN COUNTY

MAY 1979

U.S. Department of Energy

National Solar Heating and Cooling Demonstration Program

National Solar Data Program

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MONTHLY PERFORMANCE REPORT

LOUDOUN COUNTY

MAY 1979

I. SYSTEM DESCRIPTION

The Loudoun County site is the Charles S. Monroe Vocational Technical School located in Leesburg, Virginia. Solar energy is used for preheating domestic hot water (DHW). The solar energy system has an array of flat-plate collectors with a gross area of 1225 square feet. The array faces 15 degrees west of south at an angle of 37 degrees to the horizontal. A silicone oil solution is the transfer medium that delivers solar energy from the collector array to a heat exchanger. Solar energy is stored within the building in a 2056-gallon water tank.

Preheated water is supplied from the solar storage tank to a 1000-gallon DHW tank. Hot water from the DHW tank is circulated through the service hot water lines and back to the DHW tank to instantly provide hot water at the service taps. This circulation is controlled by a time clock so that circulation occurs only during hours of normal use. An electrical heating element immersed in the DHW tank provides auxiliary energy, as required, to maintain the desired 140°F service water temperature. The system, shown schematically in Figure 1, has four modes of operation, all of which operate independently of one another.

Mode 1 - Collector-to-Storage: This mode activates when there is a temperature difference of 20°F between a control sensor located at the collector and a control sensor located inside the storage tank (near the bottom). At this time the collector turns on pump P1 which circulates the transport fluid through the collectors and the heat exchanger located inside the storage tank. P1 continues to operate until the temperature difference between the control sensors is less than 5°F. At this point P1 turns off and the mode terminates. Mode 1 will also terminate when the storage tank temperature exceeds 200°F, as measured by another control sensor near the top of the storage tank.

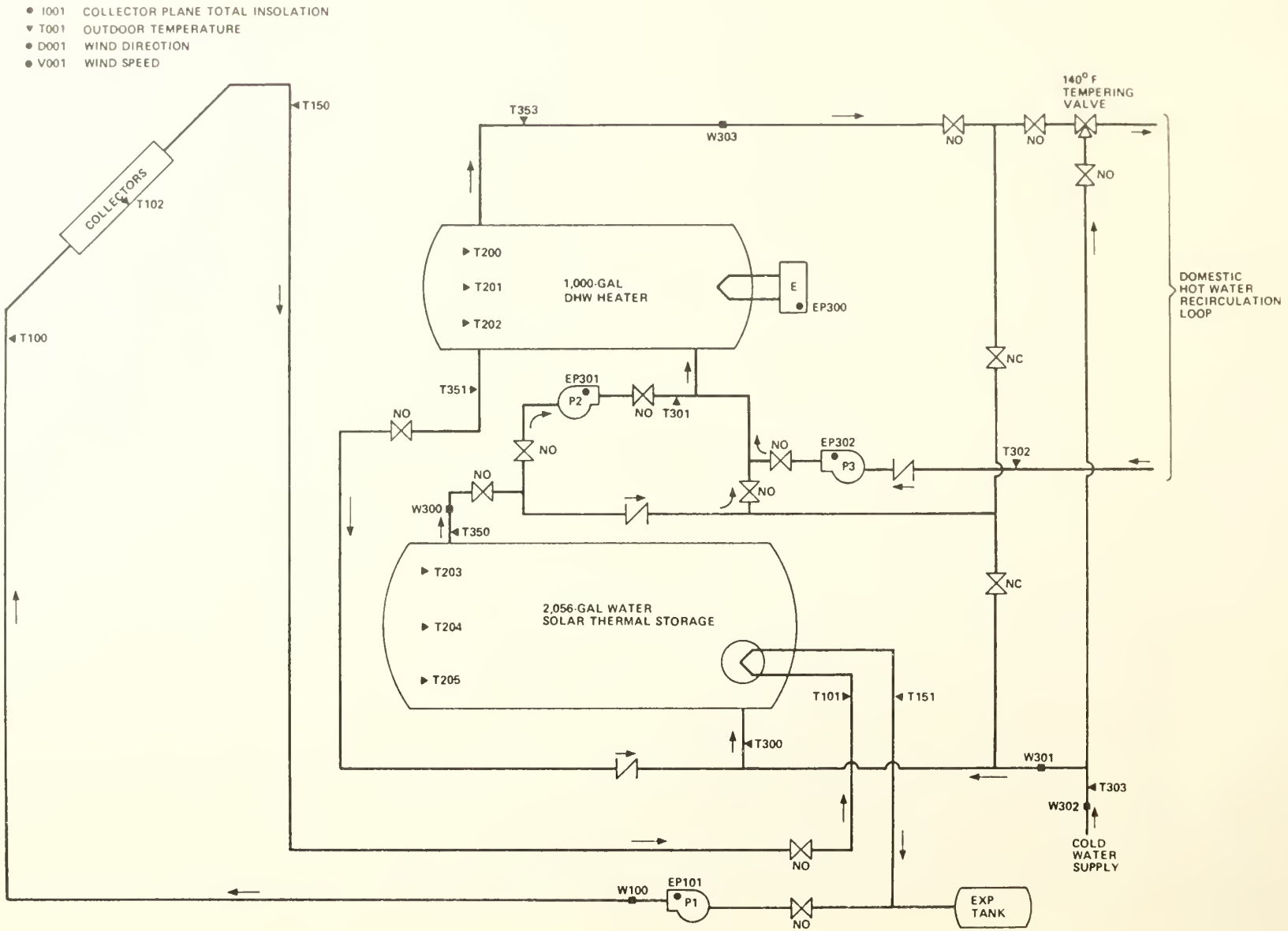

Figure 1. LOUDOUN COUNTY SCHOOL SOLAR ENERGY SYSTEM SCHEMATIC

Mode 2 - Solar Energy Preheat: This mode activates when there is a temperature difference of 20°F between a control sensor located near the top of the storage tank and a control sensor located near the bottom of the DHW tank. At this time the controller energizes pump P2 which delivers preheated water from the storage tank to the DHW tank and recirculates water from the DHW tank to the storage tank. When the temperature difference between the control sensors becomes less than 5°F, pump P2 turns off and the mode terminates. An electrical element in the DHW tank is energized to provide auxiliary water heating when the DHW tank temperature falls below a set point.

Mode 3 - Recirculate: This mode activates (under time-clock control) during hours of normal use, i.e., primarily during daylight and early evening hours every day of the week except Sunday. When activated, pump P3 is energized and hot water circulates from the hot water tank through the service hot water lines and returns to the hot water tank.

Mode 4 - DHW Load: This mode activates when hot water is drawn from any of the hot water taps in the building. The hot water demand is replenished by cold water supplied to the storage tank. The make-up water to the DHW tank from the storage tank goes through P2 (if mode 2 is active at this time) or bypasses P2 if mode 2 is inactive. Mode 3 need not be activated to supply the demand at the hot water taps.

II. PERFORMANCE EVALUATION

INTRODUCTION

The school was in session during the month of May and the solar energy system operated continuously during the month. Total solar energy collected was 18.8 million Btu and the total solar energy used was 10.2 million Btu or 54 percent of the collected energy. The stored energy decreased by 0.25 million Btu and the total system losses amounted to 14.7 million Btu. Solar energy satisfied

89 percent of the DHW requirements. The solar energy system provided an electrical energy savings of 9.9 million Btu. The performance factors are discussed below and presented in the accompanying report forms.

WEATHER CONDITIONS

During the month, total incident solar energy on the collector array was 54.8 million Btu for a daily average of 1444 Btu per square foot. This was below the estimated average daily solar radiation for this geographical area during May of 1579 Btu per square foot for a plane facing 15 degrees west of south with a tilt of 37 degrees to the horizontal. The average ambient temperature during May was 64°F as compared with the long-term average for May of 63°F. The number of heating degree-days for the month (based on a 65°F reference) was 101, as compared with the long-term average of 131. The number of cooling degree-days was 64, as compared with the long-term average of 57.

THERMAL PERFORMANCE

System - During May the solar energy system performed approximately the same as expected. The expected performance was determined from a modified f-chart analysis using measured weather and subsystem loads as input. Solar energy used by the system was estimated by assuming that all energy collected would be applied to the load. Actual solar energy used was 10.2 million Btu versus an estimated 10.6 million Btu. System total solar fraction was 89 percent versus an estimated 92 percent.

Collector - The total incident solar radiation on the collector array for the month of May was 54.8 million Btu. During the period the collector loop was operating, the total insolation amounted to 45.8 million Btu. The total collected solar energy for the month of May was 18.8 million Btu, resulting in a collector array efficiency of 34 percent, based on total incident insolation. Solar energy delivered from the collector array to storage was 15.4 million Btu: Energy loss during transfer from the collector array to storage was

3.4 million Btu. This loss represented 18 percent of the energy collected. Operating energy required by the collector loop was 0.29 million Btu.

Storage - Solar energy delivered to storage was 15.4 million Btu. There were 10.2 million Btu delivered from storage to the DHW subsystem. Energy loss from storage was 5.4 million Btu. This loss represented 35 percent of the energy delivered to storage. The storage efficiency was 65 percent: This is calculated as the ratio of the sum of the energy removed from storage and the change in stored energy, to the energy delivered to storage. The average storage temperature for the month was 116°F.

DHW Load - The DHW subsystem consumed 10.2 million Btu of solar energy and 1.3 million Btu of auxiliary electrical energy to satisfy a hot water load of 5.6 million Btu. The solar fraction of this load was 89 percent. Losses from the DHW subsystem were 5.9 million Btu. The DHW subsystem consumed a total of 0.13 million Btu of operating energy, resulting in an electrical energy savings of 10.2 million Btu. A daily average of 370 gallons of DHW was consumed at an average temperature of 118°F delivered from the tank.

OBSERVATIONS

On May 3 the mode 1 control sensor located inside the storage tank was lowered by the grantee to a location near the bottom of the tank. Since that time mode 1 deactivation has often occurred after the insolation reached a point when energy was no longer being collected. As a result, some of the previously collected solar energy was radiated by the collector array to the outside ambient. Extended mode 1 operation occurred on 19 of the 26 days in which mode 1 operated since the sensor was moved. Analysis shows that this extended mode 1 operation represented about 6 percent of the total mode 1 operating time during the month and resulted in 0.21 million Btu being radiated to the outside ambient by the collector array. It has been recommended that the control sensor be repositioned higher in the storage tank to improve mode 1 deactivation control.

A total of 3.2 million Btu, representing 54 percent of the DHW subsystem losses, were lost in the service hot water lines during mode 3 operation.

ENERGY SAVINGS

The solar energy system provided a net electrical energy savings of 9.9 million Btu. The DHW subsystem provided an electrical energy savings of 10.2 million Btu.

III. ACTION STATUS

A malfunctioning sensor (W302) must be replaced by IBM, pending NASA approval, and the mode 1 control sensor in the bottom of storage should be repositioned higher in the tank. No date has been established for either action.

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
SITE SUMMARY

SITE: LOUDOUN COUNTY
REPORT PERIOD: MAY,1979

SOLAR/2016-79/05

SITE/SYSTEM DESCRIPTION:
THE LOUDOUN COUNTY SOLAR ENERGY SYSTEM PROVIDES DOMESTIC HOT WATER PREHEATING FOR THE CHARLES S. MONROE VOCATIONAL TECHNICAL SCHOOL. THE FLAT PLATE COLLECTOR ARRAY HAS A GROSS AREA OF 1225 SQ FT. SOLAR ENERGY STORAGE CONSISTS OF A 2056 GAL WATER TANK WHICH SERVES AS A PREHEAT TANK FOR THE HOT WATER SUPPLY. A 1000 GALLON STORAGE WATER HEATER IS SUPPLIED FROM THE PREHEAT TANK AND CONTAINS AN ELECTRIC AUXILIARY HEATING ELEMENT TO PROVIDE SUPPLEMENTAL HEATING AS REQUIRED.

GENERAL SITE DATA:

INCIDENT SOLAR ENERGY	54.840	MILLION BTU
	44768	BTU/SQ.FT.
COLLECTED SOLAR ENERGY	18.800	MILLION BTU
	15347	BTU/SQ.FT.
AVERAGE AMBIENT TEMPERATURE	64	DEGREES F
AVERAGE BUILDING TEMPERATURE	N.A.	DEGREES F
ECSS SOLAR CONVERSION EFFICIENCY	0.19	
ECSS OPERATING ENERGY	0.293	MILLION BTU
TOTAL SYSTEM OPERATING ENERGY	0.426	MILLION BTU
TOTAL ENERGY CONSUMED	20.518	MILLION BTU

SUBSYSTEM SUMMARY:

	HOT WATER	HEATING	COOLING	SYSTEM TOTAL	
LOAD	5.608	N.A.	N.A.	5.608	MILLION BTU
SOLAR FRACTION	89	N.A.	N.A.	89	PERCENT
SOLAR ENERGY USED	10.236	N.A.	N.A.	10.236	MILLION BTU
OPERATING ENERGY	0.133	N.A.	N.A.	0.426	MILLION BTU
AUX. THERMAL ENERGY	1.292	N.A.	N.A.	1.292	MILLION BTU
AUX. ELECTRIC FUEL	1.292	N.A.	N.A.	1.292	MILLION BTU
AUX. FOSSIL FUEL	N.A.	N.A.	N.A.	N.A.	MILLION BTU
ELECTRICAL SAVINGS	10.199	N.A.	N.A.	9.907	MILLION BTU
FOSSIL SAVINGS	N.A.	N.A.	N.A.	N.A.	MILLION BTU

SYSTEM PERFORMANCE FACTOR: 0.980

* DENOTES UNAVAILABLE DATA
@ DENOTES NULL DATA
N.A. DENOTES NOT APPLICABLE DATA

REFERENCE: USER'S GUIDE TO THE MONTHLY PERFORMANCE REPORT OF THE NATIONAL SOLAR DATA PROGRAM, FEBRUARY 28, 1978, SOLAR/0004-78/18

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
SITE SUMMARY

SITE: LOUDOUN COUNTY
REPORT PERIOD: MAY,1979

SOLAR/2016-79/05

SITE/SYSTEM DESCRIPTION:
THE LOUDOUN COUNTY SOLAR ENERGY SYSTEM PROVIDES DOMESTIC HOT WATER PREHEATING FOR THE CHARLES S. MONROE VOCATIONAL TECHNICAL SCHOOL. THE FLAT PLATE COLLECTOR ARRAY HAS A GROSS AREA OF 1225 SQ FT. SOLAR ENERGY STORAGE CONSISTS OF A 2056 GAL WATER TANK WHICH SERVES AS A PREHEAT TANK FOR THE HOT WATER SUPPLY. A 1000 GALLON STORAGE WATER HEATER IS SUPPLIED FROM THE PREHEAT TANK AND CONTAINS AN ELECTRIC AUXILIARY HEATING ELEMENT TO PROVIDE SUPPLEMENTAL HEATING AS REQUIRED.

GENERAL SITE DATA:

INCIDENT SOLAR ENERGY	57.856 GIGA JOULES
	508381 KJ/SQ.M.
COLLECTED SOLAR ENERGY	19.834 GIGA JOULES
	174276 KJ/SQ.M.
AVERAGE AMBIENT TEMPERATURE	18 DEGREES C
AVERAGE BUILDING TEMPERATURE	N.A. DEGREES C
ECSS SOLAR CONVERSION EFFICIENCY	0.19
ECSS OPERATING ENERGY	0.309 GIGA JOULES
TOTAL SYSTEM OPERATING ENERGY	0.449 GIGA JOULES
TOTAL ENERGY CONSUMED	21.646 GIGA JOULES

SUBSYSTEM SUMMARY:

	HOT WATER	HEATING	COOLING	SYSTEM TOTAL
LOAD	5.916	N.A.	N.A.	5.916 GIGA JOULES
SOLAR FRACTION	89	N.A.	N.A.	89 PERCENT
SOLAR ENERGY USED	10.799	N.A.	N.A.	10.799 GIGA JOULES
OPERATING ENERGY	0.140	N.A.	N.A.	0.449 GIGA JOULES
AUX. THERMAL ENG	1.364	N.A.	N.A.	1.364 GIGA JOULES
AUX. ELECTRIC FUEL	1.364	N.A.	N.A.	1.364 GIGA JOULES
AUX. FOSSIL FUEL	N.A.	N.A.	N.A.	N.A. GIGA JOULES
ELECTRICAL SAVINGS	10.760	N.A.	N.A.	10.451 GIGA JOULES
FOSSIL SAVINGS	N.A.	N.A.	N.A.	N.A. GIGA JOULES

SYSTEM PERFORMANCE FACTOR: 0.980

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@ DENOTES NULL DATA
N.A. DENOTES NOT APPLICABLE DATA

REFERENCE: USER'S GUIDE TO THE MONTHLY PERFORMANCE REPORT OF THE NATIONAL SOLAR DATA PROGRAM,FEBRUARY 28,1978, SOLAR/0004-78/18

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
ENERGY COLLECTION AND STORAGE SUBSYSTEM (ECSS)

SITE: LOUDOUN COUNTY
REPORT PERIOD: MAY,1979

SOLAR/2016-79/05

DAY OF MONTH	INCIDENT SOLAR ENERGY MILLION BTU	AMBIENT TEMP DEG-F	ENERGY TO LOADS MILLION BTU	AUX THERMAL TO ECSS MILLION BTU	ECSS OPERATING ENERGY MILLION BTU	ECSS ENERGY REJECTED MILLION BTU	ECSS SOLAR CONVERSION EFFICIENCY
1	2.810	58	0.397	0.000	0.009	N	0.141
2	2.660	58	0.668	0.000	0.010	O	0.251
3	0.673	62	0.720	0.000	0.010	T	1.070
4	0.380	57	0.215	0.000	0.000		0.565
5	2.795	53	0.003	0.000	0.011	A	0.001
6	2.589	60	0.183	0.000	0.010	P	0.071
7	2.535	68	0.392	0.000	0.010	P	0.155
8	2.210	72	0.593	0.000	0.012	L	0.268
9	2.580	76	0.600	0.000	0.011	I	0.233
10	2.293	76	0.481	0.000	0.011	C	0.210
11	2.241	75	0.494	0.000	0.012	A	0.220
12	1.379	72	0.115	0.000	0.007	B	0.084
13	0.570	66	0.008	0.000	0.002	L	0.014
14	1.298	60	0.295	0.000	0.010	E	0.227
15	2.341	63	0.728	0.000	0.012		0.311
16	2.800	61	0.553	0.000	0.011		0.197
17	3.025	60	0.554	0.000	0.012		0.183
18	1.480	59	0.338	0.000	0.010		0.228
19	1.788	64	0.158	0.000	0.009		0.088
20	1.667	66	0.027	0.000	0.010		0.016
21	0.534	62	0.204	0.000	0.000		0.381
22	2.242	67	0.334	0.000	0.011		0.149
23	0.837	68	0.377	0.000	0.011		0.450
24	1.502	67	0.385	0.000	0.012		0.256
25	1.194	58	0.254	0.000	0.011		0.213
26	1.024	53	0.009	0.000	0.010		0.009
27	1.280	60	0.026	0.000	0.007		0.021
28	0.970	57	0.013	0.000	0.007		0.013
29	1.877	64	0.306	0.000	0.012		0.163
30	2.343	69	0.362	0.000	0.011		0.154
31	0.922	67	0.447	0.000	0.012		0.485
SUM	54.840	-	10.236	0.000	0.293	N.A.	-
AVG	1.769	64	0.330	0.000	0.009	N.A.	0.187
NBS ID	Q001	N113			Q102		N111

* DENOTES UNAVAILABLE DATA.
@ DENOTES NULL DATA.
N.A. DENOTES NOT APPLICABLE DATA.

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
COLLECTOR ARRAY PERFORMANCE

SITE: LOUDOUN COUNTY
REPORT PERIOD: MAY,1979

SOLAR/2016-79/05

DAY OF MONTH	INCIDENT SOLAR ENERGY MILLION BTU	OPERATIONAL INCIDENT ENERGY MILLION BTU	COLLECTED SOLAR ENERGY MILLION BTU	DAYTIME AMBIENT TEMP DEG F	COLLECTOR ARRAY EFFICIENCY
1	2.810	2.386	0.983	64	0.350
2	2.660	2.274	0.957	68	0.360
3	0.673	0.454	0.191	68	0.284
4	0.380	0.000	0.000	59	0.000
5	2.795	2.495	1.138	59	0.407
6	2.589	2.267	0.991	72	0.383
7	2.535	2.224	0.911	79	0.359
8	2.210	2.005	0.822	84	0.372
9	2.580	2.339	1.043	86	0.404
10	2.293	2.078	0.894	88	0.390
11	2.241	2.003	0.844	88	0.376
12	1.379	1.006	0.377	79	0.273
13	0.570	0.181	0.062	69	0.109
14	1.298	1.088	0.392	63	0.302
15	2.341	2.083	0.889	79	0.380
16	2.800	2.504	1.051	68	0.375
17	3.025	2.685	1.123	67	0.371
18	1.480	1.196	0.423	68	0.286
19	1.788	1.504	0.567	70	0.317
20	1.667	1.405	0.488	70	0.293
21	0.534	0.000	0.000	66	0.000
22	2.242	1.990	0.857	73	0.382
23	0.837	0.646	0.273	70	0.327
24	1.502	1.354	0.599	72	0.399
25	1.194	0.962	0.411	62	0.344
26	1.024	0.785	0.209	58	0.204
27	1.280	0.804	0.314	67	0.245
28	0.970	0.702	0.259	67	0.268
29	1.877	1.608	0.633	75	0.337
30	2.343	2.055	0.826	79	0.352
31	0.922	0.698	0.272	71	0.295
SUM	54.840	45.782	18.800	-	-
AVG	1.769	1.477	0.606	71	0.343
NBSID	Q001		Q10C		N100

* DENOTES UNAVAILABLE DATA.
@ DENOTES NULL DATA.
N.A. DENOTES NOT APPLICABLE DATA.

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
STORAGE PERFORMANCE

SITE: LOUDOUN COUNTY
REPORT PERIOD: MAY,1979

SOLAR/2016-79/05

DAY OF MONTH	ENERGY TO STORAGE MILLION BTU	ENERGY FROM STORAGE MILLION BTU	CHANGE IN STORED ENERGY MILLION BTU	STORAGE AVERAGE TEMP DEG F	STORAGE EFFICIENCY
1	0.841	0.397	0.118	125	0.612
2	0.804	0.668	-0.034	127	0.789
3	0.159	0.720	-0.752	98	-0.202
4	0.000	0.215	-0.218	76	1.000
5	1.002	0.003	0.716	90	0.717
6	0.837	0.183	0.273	122	0.545
7	0.761	0.392	0.085	131	0.627
8	0.685	0.593	-0.226	126	0.535
9	0.896	0.600	0.054	122	0.730
10	0.763	0.481	0.020	125	0.657
11	0.695	0.494	-0.021	127	0.679
12	0.274	0.115	0.011	125	0.463
13	0.019	0.008	-0.046	123	-2.022
14	0.279	0.295	-0.082	120	0.760
15	0.746	0.728	0.031	117	1.016
16	0.899	0.553	0.085	119	0.709
17	0.952	0.554	0.067	125	0.652
18	0.317	0.338	-0.145	123	0.608
19	0.454	0.158	0.054	119	0.466
20	0.360	0.027	0.132	126	0.441
21	0.000	0.204	-0.252	121	1.000
22	0.722	0.334	0.066	117	0.554
23	0.202	0.377	-0.219	112	0.779
24	0.496	0.385	0.011	106	0.799
25	0.325	0.254	-0.098	103	0.481
26	0.125	0.009	0.047	102	0.452
27	0.223	0.026	0.077	105	0.463
28	0.174	0.013	0.055	109	0.393
29	0.504	0.306	0.081	114	0.769
30	0.691	0.362	0.082	117	0.643
31	0.187	0.447	-0.220	115	1.215
SUM	15.393	10.236	-0.246	-	-
AVG	0.497	0.330	-0.008	116	0.649
NBS ID	Q200	Q201	Q202		N108

* DENOTES UNAVAILABLE DATA.
@ DENOTES NULL DATA.
N.A. DENOTES NOT APPLICABLE DATA.

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
HOT WATER SUBSYSTEM

SITE: LOUDOUN COUNTY
REPORT PERIOD: MAY,1979

SOLAR/2016-79/05

DAY OF MON.	HOT WATER LOAD MILLION BTU	SOLAR FR.OF LOAD PER CENT	SOLAR ENERGY USED MILLION BTU	OPER ENERGY MILLION BTU	AUX THERMAL USED MILLION BTU	AUX ELECT FUEL MILLION BTU	AUX FOSSIL FUEL MILLION BTU	ELECT ENERGY SAVINGS MILLION BTU	FOSSIL ENERGY SAVINGS MILLION BTU	SUP. WAT. TEMP DEG F	HOT WAT. TEMP DEG F	HOT WATER USED GAL
1	0.288	51	0.397	0.007	0.058	0.058	N	0.395	N	60	126	515
2	0.235	79	0.668	0.007	0.041	0.041	O	0.666	O	59	123	418
3	0.313	86	0.720	0.006	0.162	0.162	T	0.719	T	61	121	515
4	0.310	82	0.215	0.005	0.201	0.201		0.215		62	109	696
5	0.000	0	0.003	0.005	0.171	0.171	A	0.003	A	63	105	0
6	0.000	0	0.183	0.003	0.012	0.012	P	0.180	P	63	105	0
7	0.170	69	0.392	0.008	0.000	0.000	P	0.390	P	62	120	299
8	0.325	90	0.593	0.008	0.000	0.000	L	0.590	L	61	122	618
9	0.349	97	0.600	0.005	0.000	0.000	I	0.599	I	62	124	653
10	0.300	99	0.481	0.004	0.000	0.000	C	0.479	C	62	124	550
11	0.268	100	0.494	0.004	0.000	0.000	A	0.492	A	63	124	494
12	0.000	0	0.115	0.004	0.000	0.000	B	0.114	B	74	125	0
13	0.000	0	0.008	0.000	0.000	0.000	L	0.008	L	74	125	0
14	0.200	100	0.295	0.003	0.001	0.001	E	0.294	E	64	119	413
15	0.343	98	0.728	0.004	0.029	0.029		0.727		61	113	757
16	0.239	97	0.553	0.005	0.012	0.012		0.550		61	116	518
17	0.296	98	0.554	0.005	0.000	0.000		0.551		65	122	597
18	0.242	99	0.338	0.004	0.000	0.000		0.337		65	122	465
19	0.000	0	0.158	0.005	0.009	0.009		0.155		65	118	0
20	0.000	0	0.027	0.001	0.000	0.000		0.026		65	118	0
21	0.103	98	0.204	0.004	0.000	0.000		0.202		65	119	202
22	0.195	98	0.334	0.005	0.013	0.013		0.332		65	116	444
23	0.277	98	0.377	0.003	0.004	0.004		0.376		65	117	602
24	0.284	94	0.385	0.003	0.059	0.059		0.385		65	114	677
25	0.272	84	0.254	0.003	0.091	0.091		0.254		65	113	661
26	0.019	56	0.009	0.003	0.136	0.136		0.009		69	116	45
27	0.000	0	0.026	0.001	0.024	0.024		0.026		66	117	0
28	0.000	0	0.013	0.003	0.110	0.110		0.013		66	117	0
29	0.178	59	0.306	0.003	0.095	0.095		0.305		65	115	429
30	0.132	75	0.362	0.006	0.050	0.050		0.359		66	118	306
31	0.270	89	0.447	0.004	0.016	0.016		0.447		65	118	588
SUM	5.608	-	10.236	0.133	1.292	1.292	N.A.	10.199	N.A.	-	-	11464
AVG	0.181	89	0.330	0.004	0.042	0.042	N.A.	0.329	N.A.	64	118	370
NBS	Q302	N300	Q300	Q303	Q301	Q305	Q306	Q311	Q313	N305	N307	N308

* DENOTES UNAVAILABLE DATA.
@ DENOTES NULL DATA.
N.A. DENOTES NOT APPLICABLE DATA.

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
ENVIRONMENTAL SUMMARY

SITE: LOUDOUN COUNTY
REPORT PERIOD: MAY,1979

SOLAR/2016-79/05

DAY OF MONTH	TOTAL INSOLATION BTU/SQ.FT	DIFFUSE INSOLATION BTU/SQ.FT	AMBIENT TEMPERATURE DEG F	DAYTIME AMBIENT TEMP DEG F	RELATIVE HUMIDITY PERCENT	WIND DIRECTION DEGREES	WIND SPEED M.P.H.
1	2294	N	58	64	N	288	3
2	2171	O	58	68	O	0	1
3	549	T	62	68	T	190	6
4	310		57	59		308	2
5	2282	A	53	59	A	320	3
6	2113	P	60	72	P	0	1
7	2069	P	68	79	P	157	3
8	1804	L	72	84	L	158	3
9	2106	I	76	86	I	181	4
10	1872	C	76	88	C	173	2
11	1830	A	75	88	A	0	1
12	1126	B	72	79	B	0	1
13	466	L	66	69	L	0	0
14	1060	E	60	63	E	0	1
15	1911		63	79		0	1
16	2286		61	68		320	3
17	2469		60	67		6	3
18	1208		59	68		5	3
19	1459		64	70		39	3
20	1361		66	70		0	1
21	436		62	66		0	2
22	1830		67	73		0	1
23	683		68	70		177	2
24	1226		67	72		241	3
25	975		58	62		0	2
26	836		53	58		247	2
27	1045		60	67		190	4
28	791		57	67		0	1
29	1533		64	75		0	1
30	1913		69	79		180	3
31	753		67	71		0	1
SUM	44768	N.A.	-	-	-	-	-
AVG	1444	N.A.	64	71	N.A.	*	2
NBS ID	Q001		N113			N115	N114

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